Patent claims

1. Radio communication device (UE1) with a least one circuit board (LP14) and at least one flat antenna (AT14) in its housing (GHR), which are arranged at a distance (HA) from each other to form a coupling structure (KS14), with a coupling area (K) being enclosed in this coupling structure (KS14) between the flat antenna (AT14) and the circuit board (LP14) with a specifiable antenna volume,
characterized in that,
at least one camera (CAM) is arranged in or on the coupling area (KR) of the coupling structure (KS14) so that it simultaneously forms a component of the antenna volume of the coupling structure (KS14).

2. Radio communication device in accordance with Claim 1, characterized in that,
the camera (CAM) features and electromagnetically-sensitive camera component (LT) and an electromagnetically insensitive camera component (NLT).

3. Radio communication device in accordance with Claim 2, characterized in that,
the electromagnetically insensitive camera component (NLT) is essentially formed by the optics (OP) of the camera (CAM) and by its optics mountings (HAL).

4. Radio communication device in accordance with Claim 2 or 3
characterized in that,
only the electromagnetically insensitive camera component (NLT) is accommodated in the coupling area (KR) of the coupling structure (KS14)

5. Radio communication device in accordance with Claim 2 through 4

characterized in that,
the electromagnetically-sensitive camera component (LT) is additionally surrounded by an electromagnetic screening (SK1).

6. Radio communication device in accordance with Claim 2 through 5
characterized in that,
the electromagnetically-sensitive camera component (LT) is sunk into the circuit board (LP14).

7. Radio communication device in accordance with one of the Claims 2 to 5,
characterized in that,
the electromagnetically-sensitive camera component (LT) is arranged on the side of the circuit board (LP14) opposite the flat antenna (AT14) outside the coupling area (KR) of the coupling structure (KS14).

8. Radio communication device in accordance with one of the previous claims
characterized in that,
the camera (CAM) is arranged as regards its lengthwise extent essentially at right angles to the position of the circuit board (LP14) and the flat antenna (AT14).

9. Radio communication device in accordance with one of the previous claims
characterized in that,
the camera (CAM), viewed from the level of the flat antenna (AT14), is positioned in a hole-type cutout (LO) of the flat antenna (AT14) and is surrounded by the antenna surface of the flat antenna (AT14).

10. Radio communication device in accordance with one of the previous claims
characterized in that,

the camera (CAM), is essentially arranged in the middle in relation to the transverse extent of the housing (HR)

11. Radio communication device in accordance with one of the previous claims
characterized in that,
a PIFA (Planer Inverted F-Antenna) is provided as the flat antenna (AT14), of which the inner part (IP) is at least partly separated from its outer part (AP) by a slot (SLI).

12. Radio communication device in accordance with Claim 11
characterized in that,
the camera (CAM), viewed from the level of the flat antenna (AT14), is positioned within an area which is delimited by the outside contour (AK) of the outside frame part (AP),

13. Radio communication device in accordance with one of the Claims 11 or 12
characterized in that,
the camera (CAM) is positioned roughly in the center of the inner part (IP) of the flat antenna (AT14).

14. Radio communication device in accordance with one of the Claims 11 or 12
characterized in that,
the camera (CAM), viewed from the level of the flat antenna (AT14), is arranged in the slot (SLI) between the outer frame part (AP) and the inner part (IP) of the flat antenna (AT14).

15. Radio communication device in accordance with Claim 11
characterized in that,
the outer frame part (AP) features a cutout (AS14) in the area of a corner of the flat antenna (AT14) in which the camera (CAM) is arranged.

16. Radio communication device in accordance with one of the previous claims
characterized in that,
the circuit board (LP1) is essentially rectangular in shape.

17. Radio communication device in accordance with one of the previous claims
characterized in that,
the flat antenna (AT14) is arranged in the area of the upper side (OBS) of the circuit board (LP1).

18. Radio communication device in accordance with one of the previous claims
characterized in that,
the flat antenna (AT14) is arrange at a specifiable distance (HA) from the component mounting surface of the circuit board (LP1) in at least one further layer such that its imaginary orthogonal projection in relation to the component mounting surface of the circuit board (LP1) essentially lies within a restricted surface spanned by its edges (LLS, OBS, RLS, UBS).

19. Radio communication device in accordance with one of the previous claims
characterized in that,
the flat antenna (AT14) runs essentially in parallel to the component mounting surface of the circuit board (LP1) and doing so forms a cover over an area of the component mounting surface of the circuit board (LP1).

20. Radio communication device in accordance with one of the previous claims
characterized in that,
the flat antenna (AT14) features a slot (SP1) which

begins the inside of the antenna surface and runs to an end (OE) on the outside edge of the antenna (AT11) opening outwards.

21. Radio communication device in accordance with one of the previous claims
characterized in that,
the coupling structure (KS1) comprising the circuit board and the coupled flat antenna (AT11) features a cutout (AS1, AS1*) running through it from the front (VS) to the rear (RS) into which the camera is integrated.

22. Radio communication device in accordance with Claim 21
characterized in that,
the cutout (AS1, AS1*) running from the front (VS) to the rear (RS) in the coupling structure (KS1) is provided in the corner area between a long side (LLS) and a wide side (OBS) of the circuit board (LP1) and features two open sides.

23. Radio communication device in accordance with Claim 22
characterized in that,
the flat antenna (AT11) partly surrounds the cutout (AS1 of the circuit board (LP1) in the form of an L-profile.

24. Radio communication device in accordance with Claim 21
characterized in that,
the cutout (AS2, AS2*) running from the front (VS) to the rear (RS) in the coupling structure (KS2) is provided in the enter area of an upper side (OBS) of the circuit board (LP2) with an open side at this upper side of the circuit board (LP2), and that this cutout (AS2, AS2*) is at least partly surrounded by the flat antenna (AT12) in a U-form.

25. Radio communication device in accordance with Claim 21 characterized in that,
the coupling structure (KS3) features in its inner zone a circular cutout (AS3) running through from the front (VS) to the rear (RS) to accept the camera, which is encircled by the flat antenna (AT13)

26. Radio communication device in accordance with Claims 21 through 25
characterized in that,
the through cutout (AS1, AS1*) is essentially rectangular in shape.

27. Radio communication device in accordance with one of the previous claims
characterized in that,
the camera (CM) is embodied to be rotated such that its taking optics can be moved to and fro between the front (VS) and the rear (RS) of the coupling structure (KS1).

28. Coupling structure (KS14) consisting of at least on circuit board (LP14) and at least one flat antenna (AT14) coupled to it at a distance for a radio communication device (UE1), with a coupling area with a specifiable antenna volume being enclosed between the antenna (AT14) and the circuit board (LP14), especially in accordance with one of the previous claims,
characterized in that,
at least one camera component (NLT) of a camera (CAM) is arranged in or on the coupling area (KR) of the coupling structure (KS14) such that it simultaneously forms a component of the antenna volume.